How would monetary policy matter in the proposed African monetary unions? Evidence from output and prices

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Abstract

We analyze the effects of monetary policy on economic activity in the proposed African monetary unions. Findings broadly show that: (1) but for financial efficiency in the EAMZ, monetary policy variables affect output neither in the short-run nor in the long-term and; (2) with the exception of financial size that impacts inflation in the EAMZ in the short-term, monetary policy variables generally have no effect on prices in the short-run. The WAMZ may not use policy instruments to offset adverse shocks to output by pursuing either an expansionary or a contractionary policy, while the EAMZ can do with the 'financial allocation efficiency' instrument. Policy implications are discussed.

JEL Classification: E51; E52; E58; E59; O55
Keywords: Monetary Policy; Banking; Inflation; Output effects; Africa

1. Introduction

In the current geo-economic climate of Europe, it is clear that the spectre of the European Monetary Union (EMU) crisis is looming substantially and scarring potential monetary zones. With renewed interest in the economics of monetary union due to the ensuing EMU crisis, very few studies have examined the feasibility of the proposed African

monetary unions (Tsangarides and Qureshi, 2008; Asongu, 2012a; Asongu, 2012b; Alagidede et al., 2011). Accordingly, there is scanty empirical evidence on studies focusing on the proposed West African Monetary Zone: WAMZ (Debrun et al., 2005; Celasun and Justiniano, 2005). This is also unfortunately the case with the embryonic East African Monetary Zone: EAMZ (Mkenda, 2001; Buigut and Valev, 2005). These studies have focused on the costs and benefits of candidate countries (Debrun et al., 2005), optimality of proposed currency unions (Mkenda, 2001; Asongu, 2012a; Buigut and Valev, 2005) and adjustment to shocks (Celasun and Justiniano, 2005; Alagidede et al., 2011; Asongu, 2012b). The conclusions of the studies overwhelmingly have one common denominator: the need for greater improvement in structural and institutional characteristics that ease convergence in monetary policy. As it has been substantially documented, a paramount lesson of the EMU crisis is that serious disequilibria in a monetary union result from arrangements not designed to be robust to a variety of shocks (Willet, 2011; Willet and Srisorn, 2011; Asongu, 2012a). In light of the above, little is known about the potential effect of monetary policy on economic activity in the proposed African monetary unions.

Another strand motivating the scope and positioning of the current study is traceable to open issues in the monetary policy debate. Firstly, while in large industrial economies, changes in monetary policy affect real economic activity in the short-run (but only prices in the long-run), in transition (and developing) countries, the question of whether monetary policy variables affect output in the short-term is open to debate (Starr, 2005).

Secondly, evidence of real effects in developed economies is supportive of the idea that monetary policy can be used to counter aggregate shocks. Economic theory traditionally suggests that money affects the business cycle but not the long-term potential real output: indicating that monetary policy is neutral in the long-term. In spite of the theoretical and empirical consensus on this long-run neutrality (Lucas, 1980; Olekalns, 1996; Sarletis and

Koustas, 1998; Bernanke and Mihov, 1998; Bullard, 1999; Gerlach and Svensson, 2003; Bae et al., 2005; Nogueira, 2009), the role of money as an informational variable for decision making has remained open to debate (Roffia and Zaghini, 2008; Nogueira, 2009; Bhaduri and Durai, 2012)[1].

Thirdly, the potential for using monetary policy to affect real prices is also less clear. For instance, in countries that have experienced substantial inflation or in which labor markets are chronically slack, prices and wages are unlikely to be particularly sticky so that monetary policy changes could pass quickly via prices and have very feeble real effects (Gagnon and Ihrig, 2004). In addition, the globalization of financial markets undercut the potential of independent policy by significantly dissipating the ability of small-open economies to determine interest rates independently of world markets (Dornbusch, 2001; Frankel et al., 2004).

In light of the above debate, five challenges are central in the literature. Firstly, with the EMU crisis looming, understanding how monetary policy would affect economic activity in the embryonic African monetary zones is a key concern in scholarly and policy making circles. On a second note, the extent to which monetary policy influences output in the short-run and prices in the distant future in developing countries remains an open debate. Hence, this assessment is a relevant contribution to the scholarly and policy debate on how money matters in economic activity. Thirdly, but for a few exceptions (Moosa, 1997; Bae and Ratti, 2000; Starr, 2005; Nogueira, 2009), the literature on the long-run economic significance of money has abundantly focused on developed countries. Evidence provided by these studies may not be relevant for African countries because of asymmetric financial fundamentals. For instance, financial depth (liquid liabilities) is (are) not equal to money supply in African

[1] As a matter of fact, empirical literature reveals mixed results and the outcomes are contingent on selected countries and historical periods under investigation (Dwyer and Hafer, 1999; Stock and Watson, 1999; Trecroci and Vega-Croissier, 2000; Leeper and Roush, 2002; Bae et al., 2005).

countries because a great proportion of the monetary base does not transit via the banking sector (Asongu, 2012a).

Fourthly, the empirical investigation that has concentrated on monetary aggregates has failed to take account of other proxies that are consistently exogenous to money supply. For example, other financial intermediary aggregates of efficiency (at banking and financial system levels), activity (from banking and financial system perspectives), and size (credit of the banking sector in relation to that of the financial system) substantially affect the velocity of money. Hence, the hitherto unemployed variables could also logically have an incidence on the effectiveness of monetary policy. Moreover, financial allocation efficiency is a serious issue in African countries because of surplus liquidity issues and limited financial activity (Saxegard, 2006; Fouda, 2009). Fifthly, soaring food prices that have recently marked the geopolitical landscape of Africa has come without short-run adequate monetary measures to stem the rising price tide[2]. This paper therefore aims to tackle the challenges highlighted above in a fivefold contribution to existing literature.

The rest of the paper is organized as follows. Section 2 reviews existing literature with particular emphasis on the theory, debate, scope and positioning of the paper. The model presented in Section 3 first entails a brief highlight on the intuition motivating the empirics, then discusses the methodology before presenting the data. Empirical results are presented in Section 4. Section 5 concludes.

2. Literature review

The debate on monetary policy can be classified into two main strands: the traditional discretionary monetary policy and the non-traditional policy regimes. In the first strand, there has been a wealth of discussion on the rewards of shifting from traditional discretionary monetary policy arrangements in recent years (such as inflation targeting, monetary unions,

[2] According to the Director General of the International Food Policy Research Institute, monetary and exchange rate responses were not effective in addressing food inflation (Von Braun, 2008).

dollarization…etc). A favorable prospect of discretionary policy is that the monetary authority can use policy instruments to offset adverse shocks to output by pursuing a contractionary policy when output is above its potential or an expansionary policy when output is below its potential. For example, in the latter situation a policy-controlled interest rate can be lowered as a measure of reducing interest rate and stimulating spending. On the contrary, a monetary expansion that depreciates the real exchange rate may improve the competiveness of the country's products in domestic and world markets and hence, boost demand for national output (Starr, 2005). Moreover, a flexible countercyclical monetary policy can be practiced with inflation targeting (Ghironi and Rebucci, 2000; Mishkin, 2002).

The second strand concerns non-traditional policy regimes which limit the ability of the monetary authorities to use policy to offset output fluctuations. In fact, the degree to which a particular country can use monetary policy to affect output in the short-run is a matter of debate. Some studies in the US are consistent with the fact that a decline in the key interest rate controlled by the Federal Reserve tends to increase output over the next two to three years. However, this effect dissipates thereafter and the long-run incidence is limited to prices (Starr, 2005). Many studies have investigated whether this US tendency of 'short-term effect of monetary policy' is similar in other countries. Results have been mixed at best in seventeen industrialized countries (Hayo, 1999). Regardless of the measurement of money used, a study on two middle-income countries has found no evidence of Granger-causality flowing from money to output (Agénor et al., 2000).

From an interest rate standpoint, while Hafer and Kutan (2002) find that it generally plays a relatively more important role in explaining output in twenty OECD countries, Ganev et al. (2002) do not find such evidence in Central and Eastern Europe. Weeks (2010) asserts that the great emphasis placed by the International Monetary Fund (IMF) on monetary policy in its programmes for developing countries (especially sub-Saharan Africa: SSA) as absurdly

inappropriate since the vast majority of governments in SSAfrican countries lack the instruments to make monetary policy effective[3]. Investigating this sentiment in the context of the embryonic African monetary zones is worthwhile.

We also devote space to discussing existing literature on the EAMZ and the WAMZ. To the best of our knowledge, only three studies have focused on the EAMZ. Mkenda (2001) has employed a Generalized Purchasing Power Parity (GPPP) model to analyze the suitability of the EAC (East African Community) for a single currency union. Findings indicate that the real exchange rates between the EAC countries are cointegrated (during the period 1980-1998) and further suggest that the EAMZ could be an optimal currency area. The limitation however in this approach (as pointed-out by Buigut and Valev (2005)) is that movements in macroeconomic variables reflect the combined effects of shocks and responses (Angeloni and Dedola, 1999).

With a methodology that distinguishes errors from responses, Buigut and Valev (2005) assess the suitability of the East African countries for a regional monetary union by testing for symmetry in the underlying structural shocks. The results suggest that the supply and demand shocks are asymmetric for the most part, which does not support the forming a single currency union. However, owing to cross-country similarities in the speed and magnitude of adjustment to shocks, Buigut and Valev stress that further integration of the economies could lead to favorable conditions for a monetary union. A position shared by Asongu (2012a).

Some studies have also exclusively focused on analyzing the feasibility of forming a monetary union in the Economic Community of West African States (ECOWAS). Celasun and Justiniano (2005) have used a dynamic factor analysis to assess the synchronization of output fluctuations among candidate countries. Their findings indicate that small member

[3] The IMF views monetary policy as crucial in managing inflation and stabilizing exchange rates. Weeks posits that SSA lacks two main channels for implementing monetary policy: (1) trying to influence the creation of private credit through so-called open market operations or; (2) seeking to influence the borrowing rates for private sector by adjusting the interest rate at which commercial banks can borrow from the central bank.

states within ECOWAS experience relatively more synchronized output variations. In effect, they suggest that a monetary unification among subsets of countries is preferable over wider monetary integration. Using a model of monetary and fiscal interactions, Debrun et al. (2005) also have investigated the potential for monetary integration in the ECOWAS. Their findings suggest that the proposed union is promising for most non-'West African Economic and Monetary Union' (WAEMU) countries but not for the existing WAEMU member states.

Using hard and soft clustering algorithms to a set of variables suggested by the convergence criteria and the theory of optimal currency areas, Tsangarides and Qureshi (2008) have also assessed the suitability of the WAMZ. Findings show significant dissimilarities in the economic characteristics of member countries. Very recently, Alagidede et al. (2011) have assessed the inflation dynamics and common trend in the real domestic product of candidate countries for the embryonic WAMZ. Using fractional integration and cointegration methods, they have found significant heterogeneity among the countries. Their results are consistent with those of Asongu (2012a) that has focused on real, monetary and fiscal policy convergence.

In light of the above, one common denominator clearly stands out: the need for greater improvement in structural and institutional characteristics that ease convergence in monetary policy. Accordingly, a paramount lesson of the EMU crisis is that serious disequilibria in a monetary union result from arrangements not designed to be robust to a variety of shocks (Willet, 2011; Willet and Srisorn, 2011; Asongu, 2012a). Hence, the present study complements existing literature by assessing the equilibria of monetary policy and economic activity (output and inflation) in the proposed African monetary unions.

3. The Model

While there is a wealth of empirical studies on the effects of monetary policy on economic activity based on traditional monetary variable (money supply, private credit,

borrowing rates…etc), there is yet (as far as we know) no employment of fundamental financial intermediary performance indicators (that are exogenous to money supply) in the assessment of 'monetary policy effects' on output and prices. With this fact in mind, we are conscious of the risks of 'doing measurement without past empirical bases and argue that, '*reporting facts within the framework of an outstanding theoretical model, even in the absence of past supporting studies is a useful scientific activity*'. In addition, applied econometrics has other missions than the mere validation or refutation of economic theories with existing expositions and/or prior analytical frameworks (Asongu, 2012c; Asongu, 2012d). Hence, it is relevant to highlight the economic/monetary intuition motivating the use of hitherto unemployed financial intermediary development fundamentals.

From a broad dimension, money supply can be understood in terms of financial depth, financial allocation efficiency, financial activity and financial size. (1) Financial intermediary depth could be defined both from an overall economic standpoint and a financial system perspective. This distinction, as will be elucidated in the data section is worth discussing to elaborate detail because, unlike the developed world, in developing countries a great chunk of the monetary base does not transit through the banking sector (Asongu, 2012c). (2) Financial allocation efficiency (from banking and financial system positions) that reflects the fulfillment of the fundamental role of financial institutions (in transforming mobilized deposits into credit for economic operators) could also intuitively be conceived as the ability of banks to increase the velocity of money. (3) Financial activity (observed from banking and financial system perspectives) mirrors the ability of financial institutions to grant credit to economic operators. (4) Financial size (deposit bank assets/total assets) indicates the credit allocated by banking institutions as a proportion of total assets in the financial system (deposit bank assets plus central bank assets). Hence, the above four categories of aggregate financial intermediary fundamentals are intuitively exogenous to money supply and monetary policy.

In accordance with the postulation of Weeks (2010) on the inherent ineffectiveness of monetary policy in African countries discussed above, the insights from the 'Blinder credit-rationing model' are useful in further motivating the intuition for the African empirics. Consistent with Blinder (1987), a rethinking of novel monetary policy dynamics is needed at times: "*The reader should understand that this is merely an expositional device. I would not wish to deny that the interest elasticity and expectational error mechanisms have some validity. But the spirit of this paper is that those mechanisms do not seem important enough to explain the deep recessions that are apparently caused by central bank policy*" (p. 2). In recent memory, this postulation by Blinder is even more relevant because existing monetary and exchange rate responses have not been effective in addressing the recent food inflation (Von Braun, 2008).

In light of the literature covered in Section 2 and above motivation, the following hypotheses will be tested.

Hypothesis 1: Monetary policy variables affect prices in the long-run but not in the short-run in the proposed monetary zones.

Hypothesis 2: Monetary policy variables influence output in the short-term but not in the long-term in the proposed monetary zones.

The estimation technique typically follows mainstream literature on testing the short-run effects of monetary policy variables on output and prices (Starr, 2005) and the long-run neutrality of monetary policy (Nogueira, 2009). The approach involves unit root and cointegration tests that assess the stationary properties and long-term relationships (equilibriums) respectively. In these assessments, the Vector Error Correction Model (VECM) is applied for long-run effects whereas simple Granger causality is used for short-term effects in the absence of cointegration. While application of the former model requires that the variables exhibit unit roots in levels (and have a long-run relationship (cointegration)), the

latter is applied on the condition that the variables are stationary (or do not exhibit unit roots). Impulse response functions are used to further assess the tendencies of significant Granger causality findings.

For long-run causality, let us consider 'economic activity' (y) and money (x), such that:

$$y_t = \beta_{y0} + \beta_{yy1} y_{t-1} + ... + \beta_{yyp} y_{t-p} + \beta_{yx1} x_{t-1} + ... + \beta_{yxp} x_{t-p} + v_t^y \quad (1)$$

$$x_t = \beta_{x0} + \beta_{xy1} y_{t-1} + ... + \beta_{xyp} y_{t-p} + \beta_{xx1} x_{t-1} + ... + \beta_{xxp} x_{t-p} + v_t^x \quad (2)$$

We adopt the subscript convention that *βxyp* denotes the coefficient of economic activity(y) in the equation for money (x) at lag p. Since we are dealing with a bivariate analysis, the two equations above are replicated for economic activity (output and inflation) and each monetary policy variable. The error terms in the two equations represent the parts of yt and xt that are not related to past values of the two variables. The intuition motivating the exogeneity of the monetary policy variables has already been discussed in the data section. In event the output variable and monetary policy indicators of the VAR are cointegrated, we use the following vector error-correction (VEC) to estimate short-run adjustments to the long-run equilibrium. Otherwise we proceed by simple Granger causality (Engle & Granger, 1987).

$$\Delta y_t = \beta_{y0} + \beta_{y1} \Delta y_{t-1} + ... + \beta_{yp} \Delta y_{t-p} + \gamma_{y1} \Delta x_{t-1} + ... + \gamma_{yp} \Delta x_{t-p} - \lambda_y \left(y_{t-1} - \alpha_{\grave{a}} - \alpha_1 x_{t-1} \right) + v_t^y \quad (3)$$

$$\Delta x_t = \beta_{x0} + \beta_{x1} \Delta y_{t-1} + ... + \beta_{xp} \Delta y_{t-p} + \gamma_{x1} \Delta x_{t-1} + ... + \gamma_{xp} \Delta x_{t-p} - \lambda_x \left(y_{t-1} - \alpha_{\grave{a}} - \alpha_1 x_{t-1} \right) + v_t^x \quad (4)$$

where $y_t = \alpha_0 + \alpha_1 x_t$ is the long-run equilibrium relationship between the two variables and λ_y and λ_x are the error-correction parameters that measure how y (economic activity) and x (money) react to deviations from the long-run equilibrium. Accordingly, at equilibrium the value of the error correction term (ECT) is zero. When this term is non-zero, it means economic activity and money have deviated from the long term relationship. Therefore, the ECT helps each variable to adjust and partially restore the equation (cointegration) relationship. Eqs (1) to (4) shall be replicated for all pairs of economic activity and monetary policy (depth, efficiency, activity and size). Goodness of fit (in model specification) is based

on the AIC[4] (Liew, 2004) and the same deterministic trend assumptions used for the cointegration tests are applied.

The VAR is also a natural framework for examining Granger causality. Let us again consider the two variable system in Eqs (1) and (2). Eq. (1) models yt (economic activity) as a linear function of its own past values plus past values of x (money). If money Granger causes economic activity, then some or all of the lagged x values have non-zero effects: lagged x affects yt conditional on the effects of lagged y. It follows that testing for Granger causality in Eqs (1) and (2) amounts to testing the joint blocks of coefficients to see if they are zero or not. Hence, the null hypothesis of Eq. (1) is the position that money does not Granger cause economic activity. Therefore, a rejection of this null hypothesis is captured by the significant F-statistics, which is the Wald statistics for the joint hypothesis that estimated parameters of lagged values equal zero. Accordingly, optimal lag selection for goodness of fit is consistent with the recommendations of Liew (2004). Whereas in mainstream literature the Granger causality model is applied on variables that are mostly stationary in levels, within the framework of this study, we are also applying this test to all pairs in 'first difference' equations for three reasons: (1) consistency with application of the model to stationary variables; (2) ensure comparability; and; (3) robustness checks in case we might have missed-out something in the unit root test specifications.

We investigate 4 West and 5 East African countries with data from African Development Indicators (ADI) and the Financial Development and Structure Database (FDSD) of the World Bank for the period 1980-2010. Guinea is left-out of the WAMZ due to constraints in data availability. Summary statistics and details of the countries are presented in Panel A and Panel B respectively of Table 1. The definition of the variables and corresponding sources are presented in Table 2. In line with the literature, the dependent

[4] Akaike Information Criterion.

variables are measured in terms of annual percentage change in the Consumer Price Index (CPI) and real GDP output (Bordo and Jeanne, 2002; Bae et al., 2005; Hendrix et al., 2009).

For clarity in presentation, the independent variables are discussed in terms of financial depth (money), financial activity (credit), financial allocation efficiency and financial size. Firstly, from a financial depth standpoint, the study is consistent with the FDSD and recent African finance literature (Asongu, 2013a; Asongu, 2013b) in measuring financial depth both from overall-economic and financial system perspectives with indicators of broad money supply (*M2/GDP*) and financial system deposits (*Fdgdp*) respectively. Whereas the former denotes the monetary base *(M0)* plus demand, saving and time deposits, the latter represents liquid liabilities (or deposits) of the financial system. It is imperative to distinguish these two aggregates of money supply because since we are dealing exclusively with developing countries, a great chunk of the monetary base does not transit via formal banking institutions.

Secondly, credit is appreciated in terms of financial intermediary activity. Therefore, the study seeks to lay emphasis on the ability of banks to grant credit to economic operators. We proxy both for banking-system-activity and financial-system-activity with "private domestic credit by deposit banks: *Pcrb*" and "private credit by deposit banks and other financial institutions: *Pcrbof*" respectively. Thirdly, financial size is measured in terms of deposit bank assets (credit) as a proportion of total assets (deposit bank assets plus central bank assets).

Fourthly, financial efficiency[5] appreciates the ability of deposits (money) to be transformed into credit (financial activity). This fourth indicator measures the fundamental role of banks in transforming mobilized deposits into credit for economic operators. We take into account indicators of banking-system-efficiency and financial-system-efficiency

[5] By financial efficiency in this context, we neither refer to the profitability-related concept (notion) nor to the production efficiency of decision making units in the financial sector (through Data Envelopment Analysis: DEA).

(respectively 'bank credit on bank deposits: *Bcbd'* and 'financial system credit on financial system deposits: *Fcfd'*). The correlation matrices presented in Table 3 show that (but for financial size) the two measures adopted for each financial dynamic can be used to robustly check one another because of their high degrees of substitution.

The choice of the monetary policy variables is broadly consistent with the empirical underpinnings of recent African monetary (Asongu, 2013c) and finance (Asongu, 2013d) literature. Accordingly, we are not the first to think out of the box when it comes to the empirics of monetary policy. Blinder (1987) in assessing the effects of monetary policy on economic activity completely banished interest rate elasticities: "*In order to make credit rationing mechanism stand out in bold relief, most other channels of monetary policy (such as interest elasticities and expectational errors) are banished from the model*" (p. 2). The financial fundamentals entail all the dimensions identified by the Financial Development and Structure Database (FDSD) of the World Bank (WB).

Table 1: Summary Statistics and Presentation of Countries

Panel A: Summary Statistics

			West African Monetary Zone (WAMZ)					East African Monetary Zone (EAMZ)				
			Mean	S.D	Min.	Max.	Obser.	Mean	S.D	Min.	Max.	Obser.
Economic	Inflation		20.191	21.081	0.844	122.8	97	17.218	31.302	-100.0	200.03	153
Activity	Real Output		9.521	0.855	8.248	11.31	124	9.581	0.456	8.774	10.49	147
	Fin.	M2	0.226	0.116	0.091	0.796	114	0.224	0.118	0.046	0.498	134
	Depth	Fdgdp	0.154	0.093	0.045	0.600	114	0.171	0.110	0.026	0.414	134
	Fin.	BcBd	0.625	0.347	0.173	2.103	117	0.676	0.282	0.070	1.609	146
Finance	Efficiency	FcFd	0.629	0.326	0.209	1.812	114	0.819	0.357	0.139	1.968	134
	Fin.	Pcrb	0.096	0.066	0.014	0.350	114	0.112	0.074	0.011	0.255	134
	Activity	Pcrbof	0.099	0.068	0.014	0.368	114	0.137	0.097	0.011	0.349	134
	Fin. Size	Dbacba	0.502	0.273	0.054	1.350	117	0.628	0.198	0.110	0.999	141

Panel B: Presentation of countries

West African Monetary Zone (WAMZ)	The Gambia, Ghana, Nigeria, Sierra Leone
East African Monetary Zone (EAMZ)	Burundi, Kenya, Rwanda, Uganda, Tanzania

S.D: Standard Deviation. Min: Minimum. Max: Maximum. Obser: Observations. Fin: Financial. M2: Money Supply. Fdgdp: Liquid liabilities. BcBd: Bank credit on Bank deposits. FcFd: Financial system credit on financial system deposits. Pcrb: Private domestic credit by deposit banks. Pcrbof: Private domestic credit by deposit banks and other financial institutions. Dbacba: Deposit bank assets on Total Assets (Deposit bank assets plus Central bank assets).

Table 2: Variable Definitions

Variables	Signs	Variable Definitions	Sources
Inflation	Infl.	Consumer Price Index (Annual %)	World Bank (WDI)
Real Output	Output	Logarithm of Real GDP	World Bank (WDI)
Economic financial depth (Money Supply)	M2	Monetary Base plus demand, saving and time deposits (% of GDP)	World Bank (FDSD)
Financial system depth (Liquid liabilities)	Fdgdp	Financial system deposits (% of GDP)	World Bank (FDSD)
Banking system allocation efficiency	BcBd	Bank credit on Bank deposits	World Bank (FDSD)
Financial system allocation efficiency	FcFd	Financial system credit on Financial system deposits	World Bank (FDSD)
Banking system activity	Pcrb	Private credit by deposit banks (% of GDP)	World Bank (FDSD)
Financial system activity	Pcrbof	Private credit by deposit banks and other financial institutions (% of GDP)	World Bank (FDSD)
Banking System Size	Dbacba	Deposit bank assets/ Total assets (Deposit bank assets plus Central bank assets)	World Bank (FDSD)

Infl: Inflation. M2: Money Supply. Fdgdp: Liquid liabilities. BcBd: Bank credit on Bank deposits. FcFd: Financial system credit on Financial system deposits. Pcrb: Private domestic credit by deposit banks. Pcrbof: Private domestic credit by deposit banks and other financial institutions. WDI: World Development Indicators. FDSD: Financial Development and Structure Database. GDP: Gross Domestic Product.

Table 3: Correlation Matrices

Panel A: West African Monetary Zone (WAMZ)

Economic Activity		Financial Depth		Fin. Efficiency		Financial Activity		F. Size	
Inflation	Output	M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba	
1.000	0.147	-0.277	-0.314	-0.163	-0.203	-0.352	-0.338	-0.493	Inflation
	1.000	-0.175	-0.105	0.294	0.238	0.108	0.150	0.079	Output
		1.000	0.990	0.020	0.022	0.646	0.634	0.478	M2
			1.000	0.062	0.056	0.682	0.675	0.537	Fdgdp
				1.000	0.966	0.746	0.745	0.528	BcBd
					1.000	0.731	0.735	0.547	FcFd
						1.000	0.994	0.780	Pcrb
							1.000	0.766	Pcrbof
								1.000	Dbacba

Panel B: East African Monetary Zone (EAMZ)

Economic Activity		Financial Depth		Fin. Efficiency		Financial Activity		F. Size	
Inflation	Output	M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba	
1.000	0.059	-0.212	-0.196	-0.215	-0.226	-0.225	-0.206	-0.210	Inflation
	1.000	0.427	0.497	-0.447	-0.665	0.215	0.152	0.374	Output
		1.000	0.989	0.148	0.010	0.893	0.912	0.583	M2
			1.000	0.106	-0.057	0.884	0.900	0.576	Fdgdp
				1.000	0.870	0.450	0.461	0.234	BcBd
					1.000	0.278	0.344	0.079	FcFd
						1.000	0.953	0.600	Pcrb
							1.000	0.533	Pcrbof
								1.000	Dbacba

M2: Money Supply. Fdgdp: Liquid liabilities. BcBd: Bank credit on Bank deposits (Banking System Efficiency). FcFd: Financial credit on Financial deposits (Financial System Efficiency). Pcrb: Private credit by deposit banks (Banking System Activity). Pcrbof: Private credit from deposit banks and other financial institutions (Financial System Activity). Dbacba: Deposit bank asset on Total assets (Banking system size). Fin: Financial.

4. Empirical Results

The examination of stationary properties is based on two types of (first generation) panel unit root tests. When the variables exhibit unit roots in levels, we assess the stationary properties in their first differences. Employment of the Granger causality approach requires that the variables are stationary (or do not have a unit root). Two main types of panel unit root tests have been documented: the first generation (that is contingent on cross-sectional independence) and the second generation (which supposes cross-sectional dependence). A necessary condition for the use of the latter generation test is a cross-sectional dependence test that is only applicable if the number of cross-sections (N) in the panel is above the number of periods in the cross-sections (T). Given that we have 31 periods (T) and 5 and/or 4 cross-sections (N), we are limited to first generation types.

Thus, both the Levin, Lin and Chu (LLC, 2002) and Im, Pesaran and Shin (IPS, 2003) tests are employed. While the former is a homogenous based panel unit root test (with a common unit as null hypothesis), the latter is a heterogeneous oriented test (with individual unit roots as null hypotheses). In case of conflicting results, IPS (2003) takes precedence over LLC (2002) in decision making because in line with Maddala and Wu (1999), the alternative hypothesis of LLC (2002) is too strong. Consistent with Liew (2004), goodness of fit (or optimal lag selection) for model specification is ensured by the Akaike Information Criterion (AIC) and the Hannan-Quinn Information Criterion (HQC) for the IPS (2003) and LLC (2002) tests respectively.

Table 4: Panel unit root tests

Panel A: Unit root tests for the WAMZ

LLC tests for homogenous panel

		F. Depth (Money)		Fin. Efficiency		F. Activity (Credit)		F. Size	Inflation	Output
		M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba	(CPI)	GDP
Level	c	0.879	1.252	-0.738	**-2.89*** **	2.150	2.142	3.028	**-5.58*** **	3.229
	ct	-0.828	0.200	0.691	-0.125	2.390	2.612	0.047	**-5.86*** **	-1.024
First difference	c	**-5.01*** **	**-2.81*** **	**-6.65*** **	**-3.80*** **	**-2.10** **	-1.130	**-8.82*** **	n.a	**-6.61*** **
	ct	**-3.58*** **	**-4.14*** **	**-6.20*** **	**-3.46*** **	**-2.82*** **	**-2.30** **	**-4.57*** **	n.a	**-6.49*** **

IPS tests for heterogeneous panel

		F. Depth (Money)		Fin. Efficiency		F. Activity (Credit)		F. Size	Inflation	Output
		M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba	(CPI)	GDP
Level	c	0.103	0.647	0.101	**-1.52***	2.513	2.398	1.844	**-9.22*** **	3.865
	ct	-0.828	-0.121	1.616	**-1.34***	3.685	3.840	-0.799	**-4.25*** **	-0.159
First difference	c	**-6.47*** **	**-4.71*** **	**-6.79*** **	**-4.10*** **	**-3.33*** **	**-2.39*** **	**-9.36*** **	n.a	**-7.36*** **
	ct	**-5.54*** **	**-5.52*** **	**-6.42*** **	**-3.86*** **	**-3.15*** **	**-2.98*** **	**-9.05*** **	n.a	**-7.93*** **

Panel B: Unit root tests for the EAMZ

LLC tests for homogenous panel

		F. Depth (Money)		Fin. Efficiency		F. Activity (Credit)		F. Size	Inflation	Output
		M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba	(CPI)	GDP
Level	c	4.969	5.386	-0.461	-0.774	2.478	2.009	0.912	-0.770	1.459
	ct	3.126	2.463	0.304	1.517	2.778	2.631	0.566	-0.016	1.730
First difference	c	**-3.36*** **	**-2.86*** **	**-9.25*** **	**-1.86** **	-0.135	**-2.80*** **	**-9.67*** **	**-5.23*** **	**-7.03*** **
	ct	**-3.74*** **	**-3.08*** **	**-9.10*** **	1.054	-0.888	**-6.60*** **	**-4.63*** **	**-2.55*** **	**-5.40*** **

IPS tests for heterogeneous panel

		F. Depth (Money)		Fin. Efficiency		F. Activity (Credit)		F. Size	Inflation	Output
		M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba	(CPI)	GDP
Level	c	4.028	5.061	**-1.324***	**-1.70** **	2.234	1.817	1.192	**-2.86*** **	2.358
	ct	2.126	2.289	0.002	**-2.49*** **	-0.227	-0.430	0.260	**-2.28** **	-0.026
First difference	c	**-3.71*** **	**-3.66*** **	**-8.73*** **	n.a	**-3.16*** **	**-3.62*** **	**-10.7*** **	n.a	**-6.88*** **
	ct	**-3.29*** **	**-3.20*** **	**-8.94*** **	n.a	**-3.26*** **	**-4.95*** **	**-6.15*** **	n.a	**-4.80*** **

Notes: ***, **, * denote significance at 1%, 5% and 10% respectively. 'c' and 'ct': 'constant' and 'constant and trend' respectively. Maximum lag is 8 and optimal lags are chosen with the HQC for LLC test and the AIC for IPS test. LLC: Levin, Lin & Chu (2002). IPS: Im, Pesaran & Shin (2003). M2: Money Supply. Fdgdp: Liquid Liabilities. BcBd: Banking System Efficiency. FcFd: Financial System Efficiency. Pcrb: Banking System Activity. Pcrbof: Financial System Activity. Dbacba: Deposit Bank Assets on Total Assets. CPI: Consumer Price Index. GDP: Gross Domestic Product.

Table 4 above shows results for the panel unit root tests. Whereas Panel A presents the findings for the WAMZ, those of Panel B are for the EAMZ. For both monetary zones, while the financial variables and 'real output' are overwhelmingly integrated in the first order (i.e: they can be differenced once to be stationary), inflation is stationary in levels. These findings indicate the possibility of cointegration (long-run equilibrium) among the financial variables and real output; because, in line with the Engel-Granger theorem, two variables that are not stationary may have a linear combination in the long-run (Engle and Granger, 1987).

Consistent with the cointegration theory, two (or more) variables that have a unit root in level series may have a linear combination (equilibrium) in the long-run. In principle, if two variables are cointegrated, it implies that permanent movements of one variable affect

permanent changes in the other variable. In order to examine the potential long-run relationships, we test for cointegration using the Engle-Granger based Pedroni test, which is a heterogeneous panel-based test. Whereas we have employed both homogenous and heterogeneous panel based unit roots tests in the previous section, we disagree with Camarero and Tamarit (2002) in applying a homogenous Engle-Granger based Kao panel cointegration test because, it has less deterministic assumptions. Accordingly, application of Kao (1999) in comparison to Pedroni (1999) presents substantial issues in deterministic components[6]. Similar deterministic trend assumptions employed in the IPS (2003) unit root test are used in the Pedroni (1999) heterogeneous cointegration tests. The choice of bivariate analysis (statistics) has a twofold advantage (justification): on the one hand, it is consistent with the problem statements (or testable hypotheses) and on the other hand, it mitigates misspecification issues in causality estimations[7].

[6] Whereas Pedroni (1999) is employed in the presence of both 'constant' and 'constant and trend', Kao (1999) is based only on the former assumption (constant).

[7] For example, multivariate cointegration and corresponding error correction model may involve variables that do not exhibit a unit root in levels (See Gries et al., 2009).

Table 5: Bivariate heterogeneous Pedroni Engle-Granger based panel cointegration tests for the WAMZ and the EAMZ

Panel A: Cointegration between Monetary Policy and Output for the WAMZ

	Financial Depth (Money) & Output				Financial Allocation Efficiency & Output				Financial Activity (Credit) & Output				Fin. Size & Output	
	Money Supply		Liquid Liability		Banking System		Financial System		Banking Activity		Financial Activity			
	c	ct	c	ct	c	ct	c	ct	c	ct	c	ct	c	ct
Panel v-Stats	0.095	0.740	0.177	0.820	0.878	-0.188	0.531	-0.743	-0.422	0.977	-0.483	0.830	0.940	**1.699****
Panel rho-Stats	0.803	-0.657	0.592	-0.720	-0.323	0.599	-0.194	0.815	0.976	-0.830	1.044	-0.729	-1.068	-0.573
Panel PP-Stats	1.241	**-1.415***	0.967	**-1.466***	0.108	0.308	-0.013	0.388	1.270	**-2.09****	1.350	**-2.05****	-0.902	-0.587
Panel ADF-Stats	1.735	-1.265	1.432	**-1.325***	0.779	0.852	0.399	0.690	1.215	**-1.383***	1.348	**-1.315***	-0.900	-1.069
Group rho-Stats	1.154	0.300	1.017	0.214	0.887	1.196	0.805	1.322	0.891	-0.046	0.988	0.005	-0.767	0.616
Group PP-Stats	1.954	-0.832	1.657	-1.035	1.183	0.990	0.760	0.933	1.364	**-2.18****	1.481	**-2.231****	-0.824	0.412
Group ADF-Stats	2.730	-0.502	2.172	-0.761	1.955	1.735	1.203	1.282	1.346	**-2.25****	1.506	**-2.287****	-0.704	**-1.619***

Panel B: Cointegration between Monetary Policy and Output for the EAMZ

	Financial Depth (Money) & Output				Financial Allocation Efficiency & Output				Financial Activity (Credit) & Output				Fin. Size & Output	
	Money Supply		Liquid Liability		Banking System		Financial System		Banking Activity		Financial Activity			
	c	ct	c	ct	c	ct	c	ct	c	ct	c	ct	c	ct
Panel v-Stats	-0.505	**1.397***	-0.132	1.205	-0.729	1.970	n.a	n.a	-0.709	0.965	-0.209	**1.562***	0.617	**1.768****
Panel rho-Stats	0.252	-0.203	-0.282	0.012	1.282	0.360	n.a	n.a	1.501	0.964	0.012	0.355	**-1.594***	0.150
Panel PP-Stats	0.144	**-1.284***	-0.336	-0.896	1.634	-0.014	n.a	n.a	2.027	0.899	0.034	0.199	**-2.116****	-0.154
Panel ADF-Stats	-0.295	**-1.769****	-0.612	-1.189	1.734	-0.532	n.a	n.a	0.781	1.241	-0.186	0.583	**-2.227****	-0.644
Group rho-Stats	0.517	0.699	0.408	0.889	1.591	1.216	n.a	n.a	1.500	1.739	0.136	1.317	-0.426	0.831
Group PP-Stats	-0.154	-0.891	-0.262	-0.493	1.817	0.425	n.a	n.a	1.983	1.419	0.086	0.775	**-1.664****	0.011
Group ADF-Stats	-0.613	-0.957	-0.666	-0.511	2.062	-0.444	n.a	n.a	-0.121	1.020	0.039	0.824	**-1.729****	0.049

Notes: ***, **, * denote significance at 1%, 5% and 10% respectively. 'c' and 'ct': 'constant' and 'constant and trend' respectively. Fin: Financial. PP: Phillips-Peron. ADF: Augmented Dickey Fuller. No deterministic trend assumption. WAMZ: West African Monetary Zone. EAMZ: East African Monetary Zone.

Table 5 above presents the cointegration results for monetary policy variables and output[8]. While Panel A presents those of the WAMZ, Panel B shows findings for the EAMZ. It could be observed that there is overwhelming support for the null hypothesis of no cointegration in both panels. These findings are broadly in line with the predictions of economic theory which show that, monetary policy has no incidence on real output in the long-run. In other words, the absence of a long-run relationship between monetary policy variables and output depicts the long-term neutrality of money. It follows that permanent changes in financial intermediary dynamics (exogenous to monetary policy) do not affect permanent movements in real GDP output in the long-run in the proposed African monetary zones. Unfortunately, we are unable to establish whether permanent movements in monetary policy variables influence prices in the long-term because inflation is stationary in levels. Due to the absence of cointegration, we cannot proceed to estimate short-run adjustments to the long-run equilibrium with a VECM. Consistent with the Engle-Granger methodology, in the absence of cointegration, short-run effects can be estimated by simple Granger causality.

Table 6 below presents the Granger causality results. While Panel A shows findings of the WAMZ, Panel B reveals those of the EAMZ. Based on the findings of Panel A, it can be established that monetary policy variables have no short-term effect on real GDP output and inflation. Note should be taken of the fact that the significant finding of Granger causality flowing from financial size to inflation cannot be validated because financial size is stationary only in first difference (see Panel A of Table 4). The findings from Panel B show that financial efficiency Granger causes real GDP output and financial size Granger causes inflation.

[8] Note should be taken of the fact that, inflation and financial system activity are not taken into account in the cointegration analysis because they are stationary.

Table 6: Short-run Granger causality analysis

Panel A: Monetary policy and Economic Activity for the WAMZ

Null Hypothesis: Monetary policy does not cause Real GDP Output

	Financial Depth (Money)		Financial Efficiency		Fin. Activity (Credit)		Fin. Size
	M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
Levels	0.242	0.115	0.068	0.032	0.210	0.197	0.952
	D[M2]	D[Fdgdp]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1st Difference	0.118	0.054	0.120	0.033	0.112	0.156	2.151

Null Hypothesis: Monetary policy does not cause Inflation

	Financial Depth (Money)		Financial Efficiency		Fin. Activity (Credit)		Fin. Size
	M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
Levels	0.654	0.679	0.003	0.016	0.603	0.265	**5.176*****
	D[M2]	D[Fdgdp]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1st Difference	1.133	1.121	0.070	0.377	1.478	1.434	0.925

Panel B: Monetary policy and Economic Activity for the EAMZ

Null Hypothesis: Monetary policy does not cause Real GDP Output

	Financial Depth (Money)		Financial Efficiency		Fin. Activity (Credit)		Fin. Size
	M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
Levels	0.175	0.163	**3.387****	**4.183****	0.368	1.338	0.581
	D[M2]	D[Fdgdp]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1st Difference	1.486	1.357	0.764	**3.256****	0.949	1.516	0.390

Null Hypothesis: Monetary policy does not cause Inflation

	Financial Depth (Money)		Financial Efficiency		Fin. Activity (Credit)		Fin. Size
	M2	Fdgdp	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
Levels	0.367	0.369	1.686	0.359	0.335	0.260	0.486
	D[M2]	D[Fdgdp]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1st Difference	0.103	0.026	1.690	0.884	0.024	0.013	**2.524***

Null Hypothesis of Panel A: Monetary Policy does not Granger cause real GDP output. M2: Money Supply. Fdgdp: Liquid liabilities. BcBd: Bank credit on Bank deposits (Banking System Efficiency). FcFd: Financial credit on Financial deposits (Financial System Efficiency). Pcrb: Private domestic credit (Banking System Activity). Pcrbof: Private credit from deposit banks and other financial institutions (Financial System Activity). Dbacba: Deposit bank asset on Total assets (Banking System Size). Fin: Financial. WAMZ: West African Monetary Zone. EAMZ: East African Monetary Zone.

Surprisingly (contrary to our expectation), monetary policy variables do not affect output in the short-term (as opposed to the situation in developed countries). The overwhelming absence of significant causalities flowing from monetary policy to inflation in the short-run is consistent with economic theory and in line with our expectations (hypotheses). For the few significant Granger causality results, the F-statistics upon which the conclusions are based cannot be used to draw any economic inferences. Hence, the impulse-

response functions of such relationships will provide additional information (material) on the scale and timing of responses to shocks.

We now perform the IFRs for the EAMZ. Using a Choleski decomposition on a VAR with ordering: 1) inflation/output, 2) a monetary policy variable; we compute impulse response functions (IRFs) for output and financial efficiency on the one hand, and for financial size and inflation on the other hand. While Figure 1 shows the dynamic responses (to shocks) between output and financial efficiency, Figure 2 depicts those between financial size and inflation. In the graphical representations of the IRFs, the dotted lines are the two standard deviation bands which are used to measure the significance (Agénor et al., 1997: 19). From the response of output to financial efficiency in Figure 1, it could be established that with a positive shock in financial efficiency, output will significantly increase in the first year, then drop in the second year, level-up in the third-year before progressing the next two years to a long-term neutral position. This response is broadly consistent with the predictions of economic theory on the economic benefits of financial allocation efficiency. From Figure 2, a shock in financial size does not have a very significant effect on the temporary component of inflation during the first year, then a sharp deflation is witnessed during the second year, followed by a steep inflation in the third year from which point the effect is neutralized. While only one graph in either Figure 1 or Figure 2 has been discussed, the other graphs serve to confirm the general stability of the VAR models.

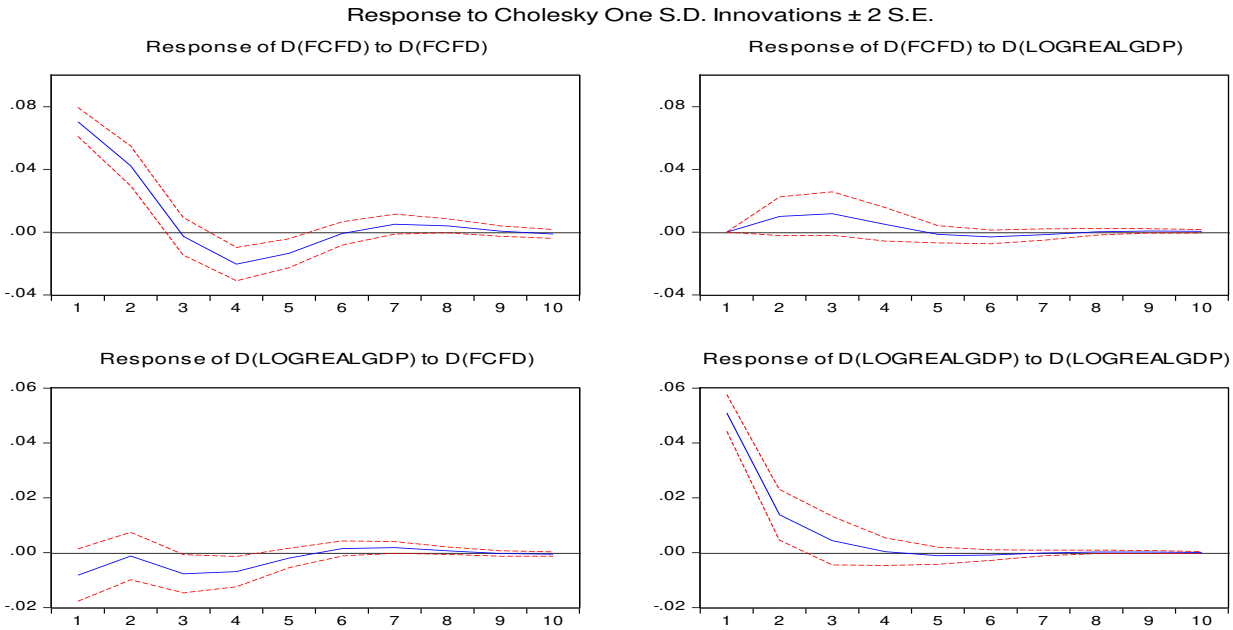

Figure 1: Financial System Efficiency and real GDP output (EAMZ)

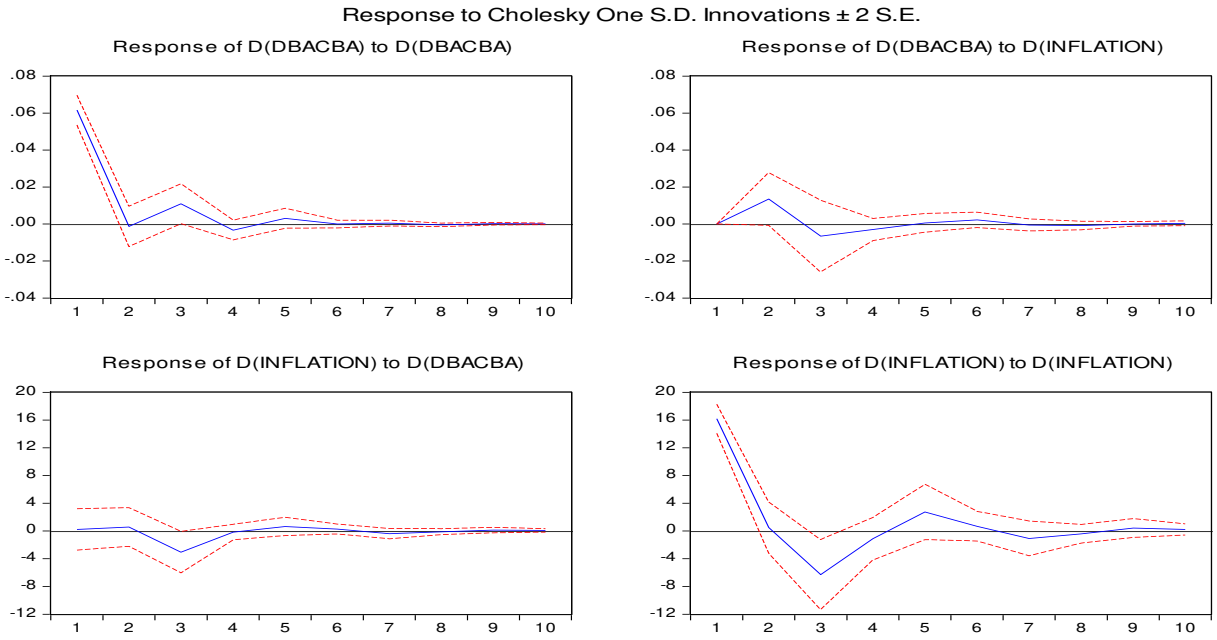

Figure 2: Financial Size and Inflation (EAMZ)

In order to ensure that our results and estimations are robust, the following have been performed or checked. (1) But for financial size, for almost every financial variable (depth, efficiency or activity), two indicators have been employed. Therefore, the findings have broadly encompassed measures of financial development from banking and financial system perspectives. (2) Both homogenous and heterogeneous assumptions have been considered in

the unit root tests. (3) Optimal lag selection for model specifications has been consistent with the goodness of fit recommendations of Liew (2004)[9]. (4) Granger causality has been performed both in level and first difference equations (for reasons already discussed). (5) Impulse response functions have been used to further examine the tendencies of significant Granger causality results.

In the discussion of results, it would be interesting to examine the tested hypotheses in light of the findings before providing relevant policy implications.

Hypothesis 1: Monetary policy variables affect prices in the long-run but not in the short-run in the proposed monetary zones.

Firstly, we have not been able to establish whether monetary policy variables affect prices in the long-term because the inflation variable has been stationary in levels. Thus, the absence of a chaotic inflation has limited the feasibility of any cointegration analysis between inflation and the monetary policy variables. Secondly, the overwhelming absence of any causality flowing from financial variables to prices in the short-term is consistent with the predictions of economic theory and the second part of *Hypothesis 1*. Hence, based on empirical validity, *Hypothesis 1* is broadly true.

Hypothesis 2: Monetary policy variables influence output in the short-term but not in the long-run in the proposed monetary zones.

Firstly, but for financial system efficiency (in the EAMZ), changes in monetary policy variables have barely any incidence on output in the short-run. Secondly, we have seen that

[9] "*The major findings in the current simulation study are previewed as follows. First, these criteria managed to pick up the correct lag length at least half of the time in small sample. Second, this performance increases substantially as sample size grows. Third, with relatively large sample (120 or more observations), HQC is found to outdo the rest in correctly identifying the true lag length. In contrast, AIC and FPE should be a better choice for smaller sample. Fourth, AIC and FPE are found to produce the least probability of under estimation among all criteria under study. Finally, the problem of over estimation, however, is negligible in all cases. The findings in this simulation study, besides providing formal groundwork supportive of the popular choice of AIC in previous empirical researches, may as well serve as useful guiding principles for future economic researches in the determination of autoregressive lag length"* (Liew, 2004:2).

financial variables are not cointegrated with real output. Therefore, *Hypothesis 2* is only partially correct; that is, with respect to the long-run neutrality of money.

Three main policy implications result from the findings above: the long-run neutrality of money and business cycles, credit expansions and inflationary tendencies (targeting) and, the manner in which the findings reconcile the ongoing debate.

On the implication for the long-run neutrality of money and business cycles, economic theory has traditionally suggested that monetary policy can affect the business cycle but not the long-run potential output. Despite theoretical and empirical consensus on money neutrality well documented in the literature, the role of money as an informational variable for monetary policy decisions has remained open to debate due to empirical works providing conflicting results. The long-run neutrality of money has been confirmed both for the WAMZ and the EAMZ. From a business cycle perspective, but for the effect of financial efficiency on output (in the EAMZ), the influence of monetary policy is not overwhelmingly apparent; confirming a study by Agénor et al. (2000) in two middle-income countries for which no evidence was found of Granger-causality flowing from money to output, regardless of the measures of money employed. The logical implication of this analysis is that while the EAMZ could use financial allocation efficiency as a short-term monetary policy instrument to influence its economic activity or the business cycle, the WAMZ does not have any monetary policy instrument for such a purpose among the financial variables assessed.

Looking at the implications for credit expansions and inflationary tendencies (targeting), there is a general consensus among analysts that significant money stock expansions that are not coupled with sustained credit improvements are less likely to have any inflationary effects. This position is broadly true in the long-run because monetary policy variables should theoretically have no incidence on prices in the short-term. From the hypotheses that have been investigated in the study, we could reframe the consensus into an

important question that policy makers are most likely to ask today: "would expansionary monetary policy in the proposed African embryonic zones exert any inflationary pressures on prices in the short-term?" The results broadly indicate monetary policy can be used in the short-run without affecting prices. This is an indirect suggestion that in the long-run, the monetary policy variables could be appropriate for inflation targeting.

On the concern of how the findings reflect the ongoing debate, the long-term effect (neutrality) of monetary policy on output and the overwhelming failure of financial variables to affect prices in the short-term are part of our findings that are consistent with the traditional discretionary monetary policy arrangements that favor commitments to price stability and international economic integration (like inflation-targeting and monetary unions respectively). Conversely, the absence of any short-run impact of monetary policy on output is consistent with the second strand of the debate which sustains that non-traditional policy regimes limit the ability of monetary authorities to use policy to offset output variations. This failure of monetary policy to affect short-term real GDP is in line with the postulation of Weeks (2010) who views the IMF oriented approach as absurdly inappropriate because a vast majority of governments in SSA countries do not have the necessary instruments to make monetary policy effective. Hence, based on the findings the monetary authority of the proposed WAMZ may not use policy instruments to offset adverse shocks to output by pursuing either an expansionary or a contractionary policy, while that of the EAMZ could do with the 'financial allocation efficiency' instrument.

The redeeming feature of the EAMZ is broadly in line with Mkenda (2001) who has used the GPPP model to analyze the suitability of the EAC for a single currency union and concluded that the EAMZ could be an optimal currency area. However the findings are generally more consistent with Buigut and Valev (2005) who have criticized the Mkenda (2001) approach for failing to distinguish errors from responses. Hence, it could be

established that our findings are in accordance with Buigut and Valev (2005) and Asongu (2012a) on the recommendation that further integration of the economies could lead to favorable conditions for a monetary union. The findings for the WAMZ are also consistent with recent literature that has established significant dissimilarities in the economic characteristics of member countries (Tsangarides and Qureshi, 2008) or substantial heterogeneity among the countries (Alagidede et al., 2011).

The main caveat in this study is that we have only considered financial intermediary performance determinants of output and inflation in the analysis. However, in the real world, economic activity from real output and inflation perspectives is endogenous to a complex set of variables: exchange rates, price controls, wages…etc. Thus, the interactions of financial depth, efficiency, activity and size with other determinants of economic activity could result in other dynamics of consumer price inflation and output. Hence, replication of the analysis with other fundamentals of economic activity in a multivariate VAR context would be interesting. Another relevant future research direction could be to assess whether the findings are relevant to country-specific cases of the sample. In so doing, policy makers could be enlightened more on which particular countries in the embryonic monetary zones need more work for monetary policy convergence.

5. Conclusion

A major lesson of the EMU crisis is that serious disequilibria in a monetary union result from arrangements not designed to be robust to a variety of shocks. With the specter of this crisis looming substantially and scarring potential monetary zones, the present study has complemented existing literature by analyzing the effects of monetary policy on economic activity (output and prices) in the proposed African monetary unions. Findings have broadly shown that: (1) but for financial efficiency in the EAMZ, monetary policy variables affect output neither in the short-run nor in the long-term and; (2) with the exception of financial

size that impacts inflation in the EAMZ in the short-term, monetary policy variables generally have no effect on prices in the short-run. Based on the results, the WAMZ may not use policy instruments to offset adverse shocks to output by pursuing either an expansionary or a contractionary policy, while the EAMZ could do with the 'financial allocation efficiency' instrument. Policy implications have been discussed.

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